



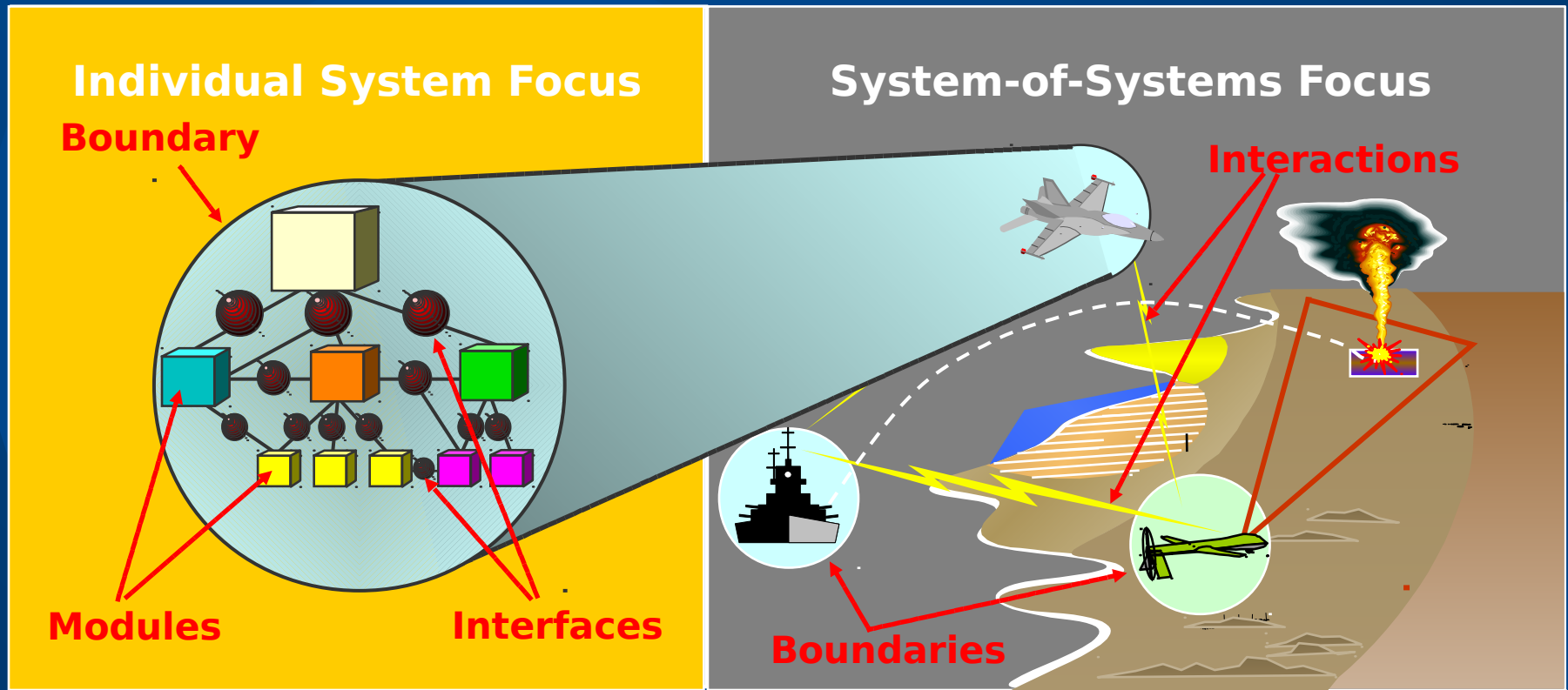
# Integrating System Architecture & Engineering Applications Using Open Systems



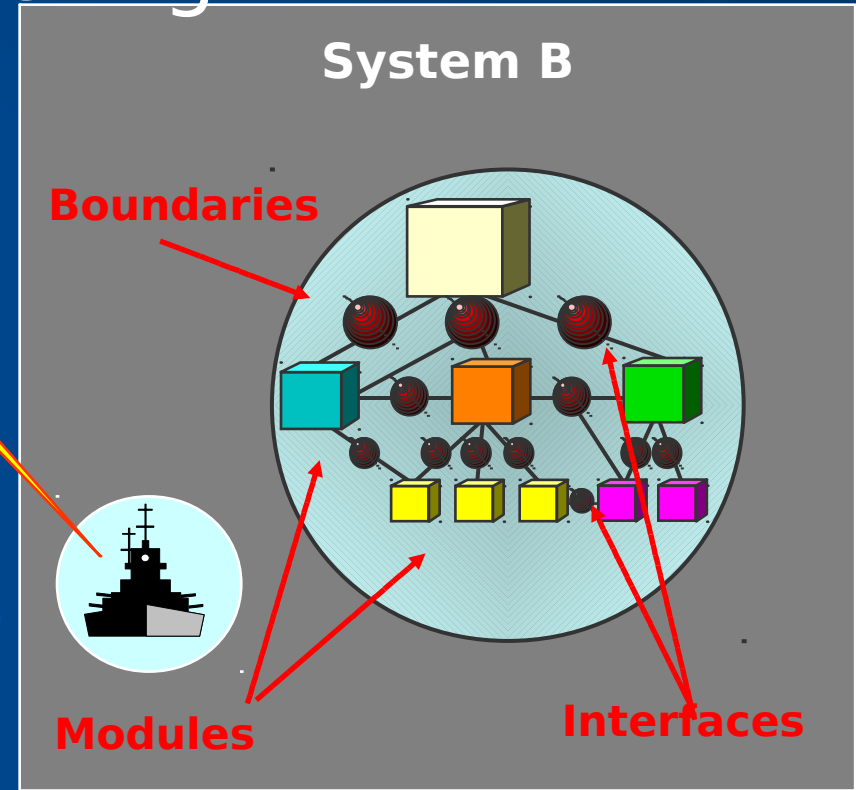
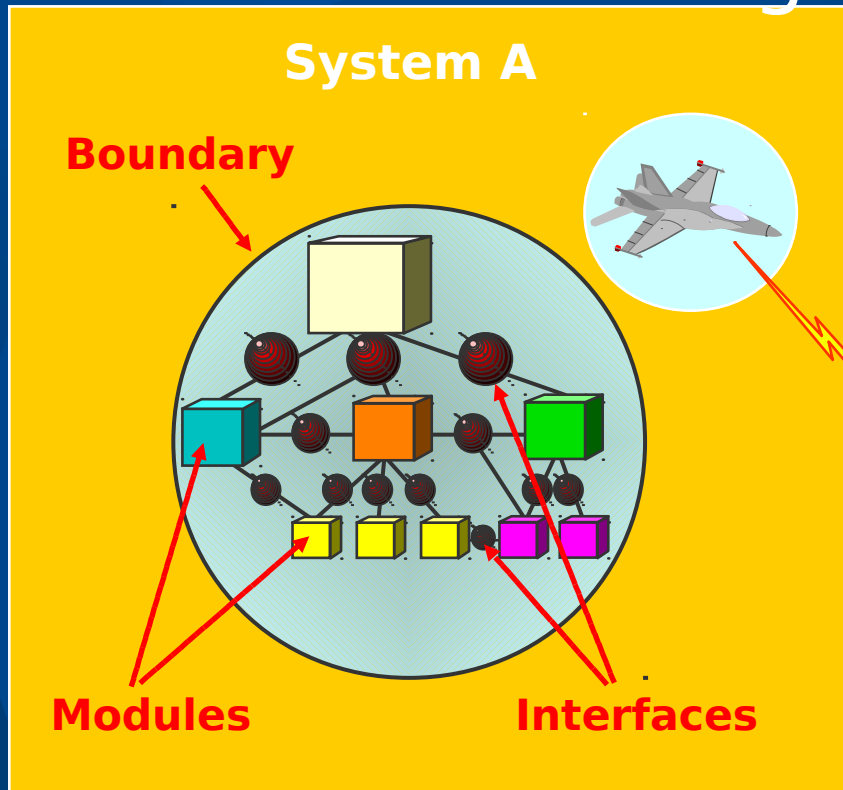
David Price  
OSJTF SoS Architecture Modeling  
Meeting  
September 22, 2005

# System-of-Systems Architecture

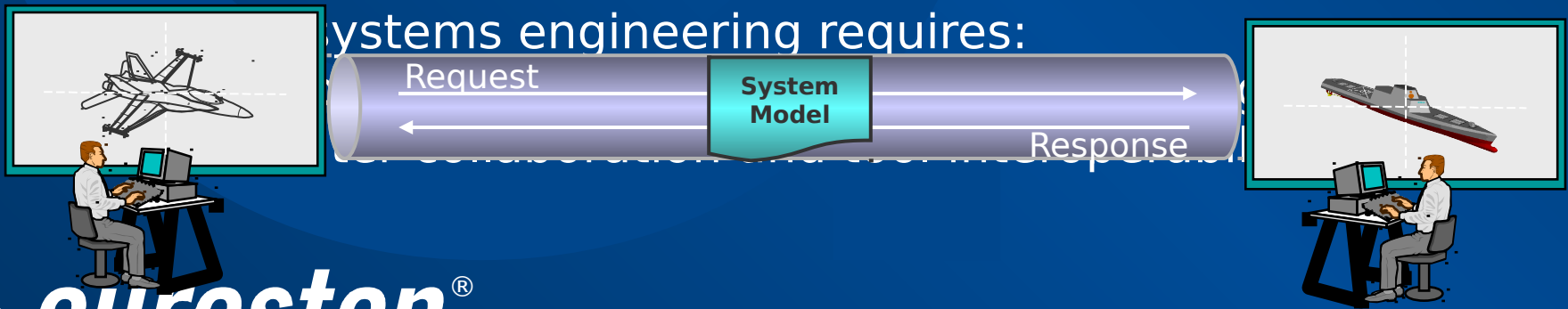
Increasingly, architectures are used as basis for programmatic decisions. This increases importance of their consistency, precision and scalability.



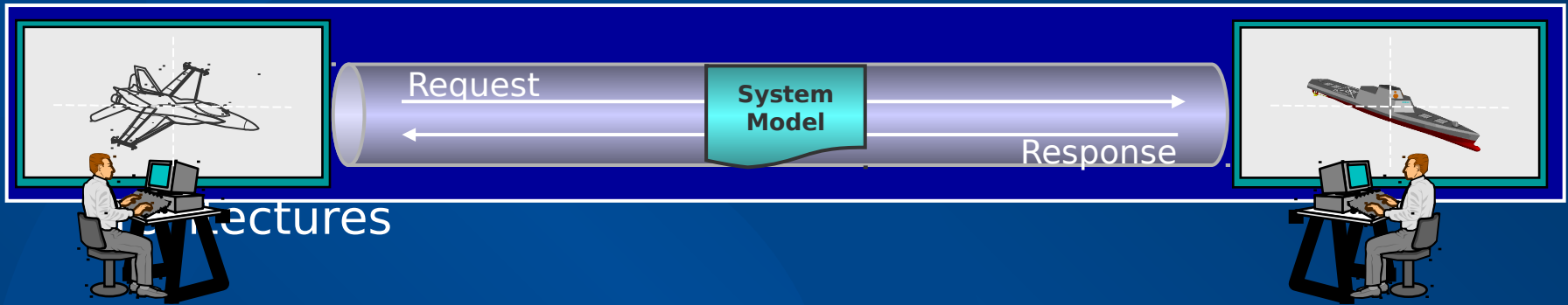
# Collaborative System-of-Systems Engineering



systems engineering requires:



# Our Focus is on SE Standards



- Enable communication between SEs and the tools they use
  - Approach described in white paper : *Using Systems Engineering Standards In an Architecture Framework*
  - Influenced by DoD, INCOSE, ISO STEP and OMG communities

# AP233 Systems Engineering



- AP233 = ISO standard specifying communications pipeline between Systems Engineering tools and databases
- Designed to be neutral vs DODAF, MODAF, SysML, UML, IDEF, other SE tools, ... which are more specific
- As part of ISO STEP series, AP233 links to standards with a vast scope
  - AP stands for “Application Protocol”
    - APs are very formal and strict – intended to prevent ambiguity in data exchange
    - APs define the types of data to be exchanged and the structure of that data
  - There are 40+ STEP Application Protocols
  - AP233, like all new modular APs, is built from reusable information model “modules” for compatibility across application domains

# DoDAF CADM/AP233 Project

- Purpose
  - Evaluate feasibility of system architecture data exchange using emerging ISO AP233 Systems Engineering standard
    - Not a fully validated design effort
  - Provide a body of work that future efforts can build upon
- Phase 1 and 1a Scope
  - SV-1, SV-2, SV-3, SV-4, SV-10b, OV-5, OV-6b, TV-1 subset
  - Delivered via [www.exff.org/ap233](http://www.exff.org/ap233) Web site
- Phase 2 includes all remaining products
  - Plus AP233 High Level API
  - Plus Extras such as:
    - SysML/AP233 State Machine translation specification
    - SysML Requirement/Systems Allocation demo





DODAF

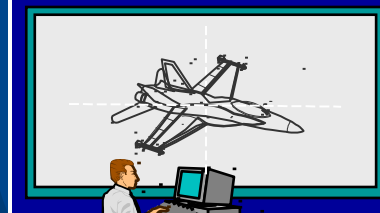
specifies requirements for



ISO STEP-enabled  
Downstream Tool



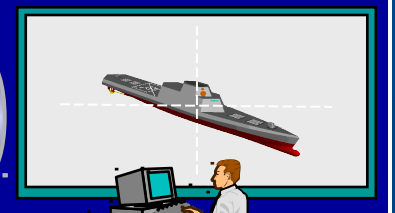
Any SE Tool



Request

**AP233**  
System Engineering

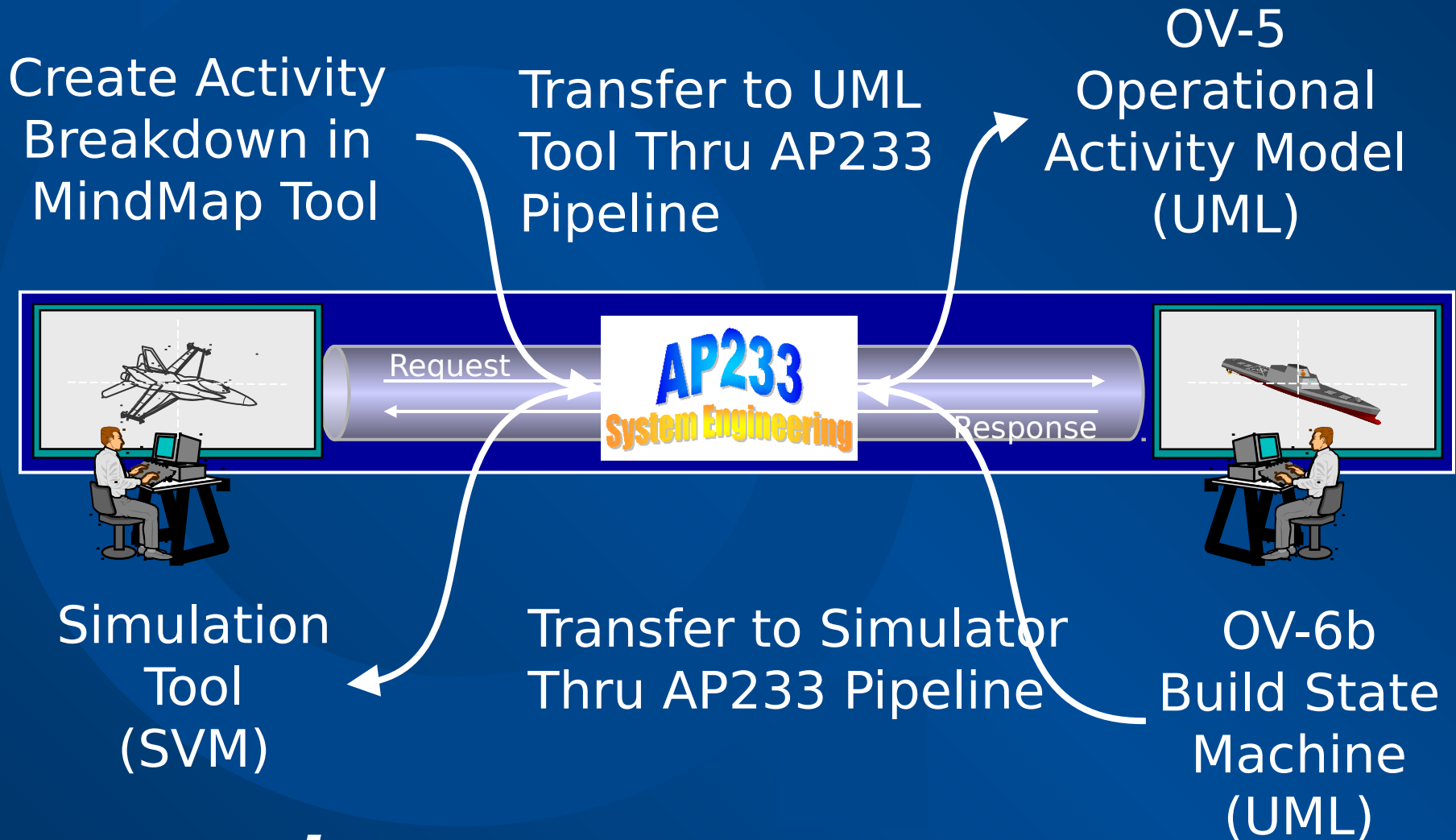
Response



**DOD CADM**

**DoD Architecture  
Repository System**

# Demo : Executable Architectures





## SysML-ISO AP233 Converter Demo

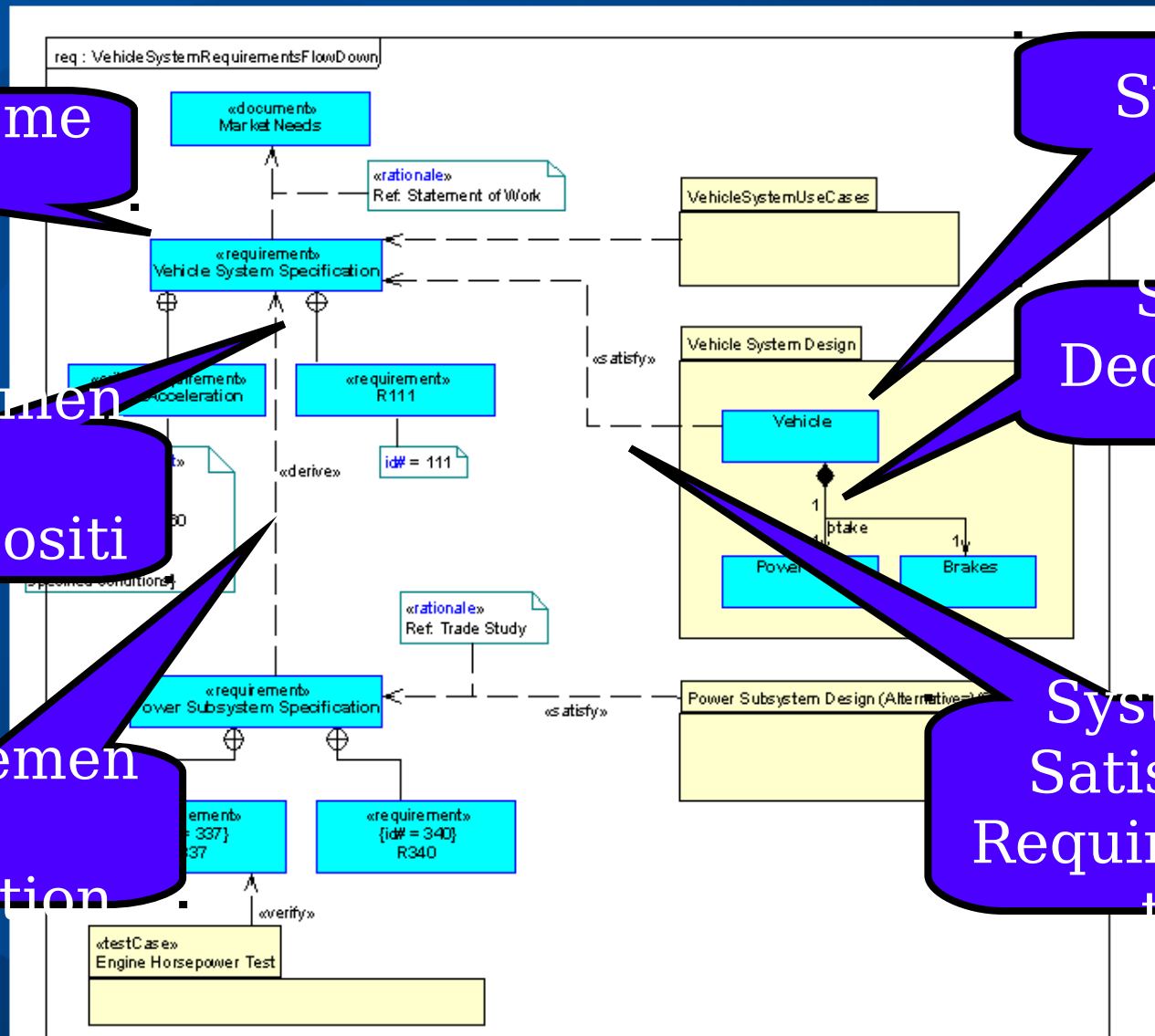


Eurostep: David Price and Phil Spiby

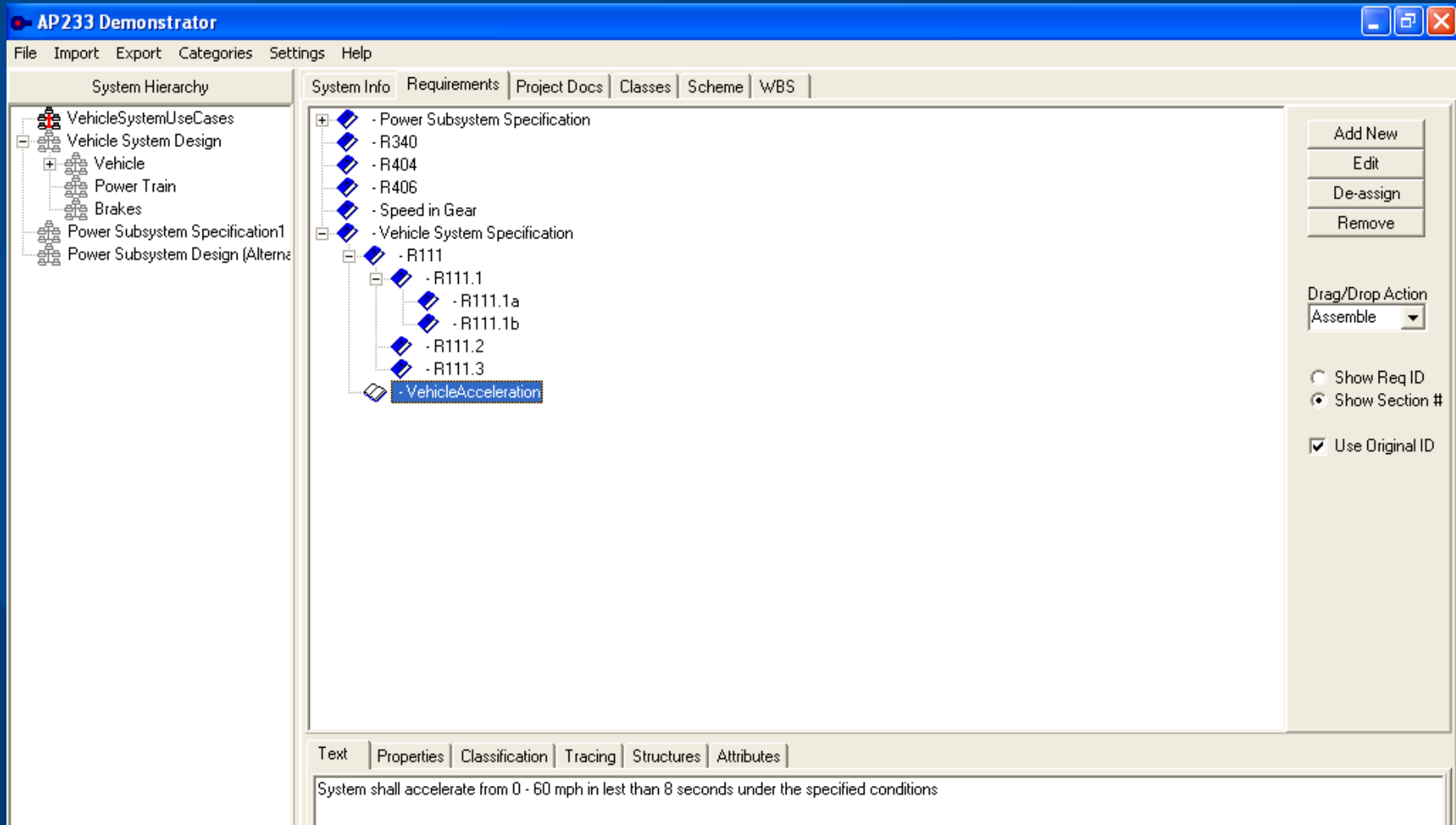
ARTiSAN: Alan Moore

INCOSE International Symposium  
July 2005

# SysML example



# In AP233 Demonstrator



# Conclusions

- ISO STEP already supports
  - Core SysML Requirements concepts
  - Core SysML System concepts
- AP233-specific extensions should broaden SysML coverage
- SysML/AP233 translator implementation can support industry needs, yet be simple and inexpensive if we:
  - “stay out of the weeds” in STEP-land
  - use widespread technology